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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,583	07/28/2006	Jonathan Hughes	WW/3-22352/A/PCT	9687

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EXAMINER	
ARIANI, KADE	

ART UNIT	PAPER NUMBER
1651	

NOTIFICATION DATE	DELIVERY MODE
10/27/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/587,583	HUGHES ET AL.	
	Examiner	Art Unit	
	KADE ARIANI	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-21 and 23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-21 and 23* is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on June 24, 2009, has been received and entered.

Claims 1-3, 5-21 and 23 are pending in this application and were examined on their merits.

Claim Objection

Claim 1 was and is objected to because of the following informalities:

The term --salts-- is misspelled as "sals" in claim 1 (line 11).

Appropriate correction is required.

Double Patenting Rejections

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re*

Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 5-21, and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 9, and 12-20 of Hughes (US application No. 10/523302). Although the conflicting claims are not identical, they are not patentably distinct from each other because;

Claims 1, and 9- 20 of Hughes are drawn to a process comprising the steps of forming a fermentation product at a temperature of at least 50°C ((i) to (ii)), and subjecting the mixture to one or more separation stage, separating the fermentation product from the broth by employing one or more flocculation agents ((ii) and (viii)), introducing cationic and anionic polymers into the mixture (claim 17), swellable clays and silica based materials (claim 13), solid by-product is lignin and analogous material (claim 19), and fermentation product is ethanol, glycerol, and amino acids (claim 20).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to use the process disclosed by of Hughes to provide a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5-21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verser et al. (US Patent No. 6,927048) in view of Coffey et al. (US 2003/0155091 A1), and further in view of Ovenden et al. (Colloids and surfaces A: Physicochemical and Engineering Aspects, 2002, Vol. 197, p.225-2340) and Song et al. (J Appl Polym Sci, 2003 Vol. 87, p.1101-1108).

Claims 1-3, 5-21, and 23 are drawn to a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage,

wherein the fermentation liquor is produced in a fermentation process for the production of a fermentation product, in which the liquor has been subjected to a temperature of at least 50°C, wherein the solid-liquid separation stage is assigned by a treatment system, the treatment system comprises an anionic polymer selected from natural polymers, modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acid and salts, the anionic polymer exhibits intrinsic viscosity of at least 4 dl/g, the treatment system further comprises addition of a cationic polymers, the cationic polymer that exhibits an intrinsic viscosity of below 4dl/g, the cationic polymer exhibits a charge density of at least 3 meq/g, the cationic polymer is DADMAC, the anionic polymer and cationic polymer are added sequentially, the dose of anionic polymer is at least 50 grams per tonne, the dose of cationic polymer is at least 50 grams per tonne, the treatment system further comprises addition of a siliceous material, the siliceous material is bentonite type clay, and the fermentation liquor is subjected to a mechanical dewatering, and the fermentation product is selected from the group consisting of ethanol.

Verser et al. teach a fermentation liquor (broth) produced in a fermentation process for the production of a fermentation product (ethanol and acetic acid), in which the liquor has been subjected to distillation (column 3 lines 38- 66, column 15 line 1-4, 27-29, and 64-67, column 16 lines 7-16). Verser et al. further teach the ethanol is removed from the water stream which is discharged from the column and separated by

a simple liquid-solid separation into the solid base for recycle (column 16 lines 6-16, 22-30). Verser et al. teach the net effect of the reactive distillation process is to recover the acetic acid from the dilute salt solution thereby producing a relatively concentrated product stream, without vaporizing the water that forms the bulk of the stream. The integration of liquid-solid separation reduces the energy requirement. Verser et al. teach simultaneous removal of the product shifts the esterification equilibrium and leads to higher conversion in a short time (column 16. lines 26-34).

Verser et al. do not teach the treatment system comprises an anionic polymer selected from natural polymers, (modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units), which anionic monomer units are selected from the group consisting of (meth) acrylic acid and salts, the anionic polymer exhibits intrinsic viscosity of at least 4 dl/g, the treatment system further comprises addition of a cationic polymers, the cationic polymer that exhibits an intrinsic viscosity of below 4dl/g, the cationic polymer exhibits a charge density of at least 3 meq/g, the cationic polymer is DADMAC, the anionic polymer and cationic polymer are added sequentially, the dose of anionic polymer is at least 50 grams per tonne, the dose of cationic polymer is at least 50 grams per tonne, the treatment system further comprises addition of a siliceous material, the siliceous material is bentonite type clay, and the fermentation liquor is subjected to a mechanical dewatering. However, Coffey et al. teach a dewatering method (a treatment system) using polymers flocculants comprises of cationic and anionic monomers and using such polymers for displacing unwanted soluble or colloidal

materials from an aqueous cellulosic suspension as well as to increase the efficiency of the dewatering (Abstract , p.1 0002, 0005, and 0006). Coffey et al. teach the cationic polymer is DADMAC (p.2 0031). Coffey et al. teach monomer is prepared by combining 47.6 % solution (p.7 0092). Coffey et al. teach anionic monomers, acrylic acid and methacrylic acid (p.4 0045). Coffey et al. teach cationic monomer with intrinsic viscosity of at least 4 dl/g (greater than 5dl/g) (p.2 0029 line 6). Coffey et al. further teach using microparticle and siliceous material to improve flocculation, colloidal silica, and saponite (p. 6 0076). Coffey et al. teach also bentonite type clays (0075 and 0078). Coffey et al. further teach mechanical dewatering (press dewatering) (p.9 1st column line 3). Coffey et al. also teach polymer dose of at least 50 gram per tonne (0.065 kg/ton equivalent of 65g/ton) (p.9 Table 5 1st column 1st row).

Moreover, at the time the invention was made it was well known in the art that both the charge density and the molecular weight of an anionic polymer (e.g. polyacrylamide) or cationic polymer can be varied by varying the monomer ratio. Varying ratio of monomer provide polymers with different charge densities (see Song et al. Abstract and p.1102 Table 1 1st and 2nd columns), and that a charged polyacrylamide will be more effective as flocculant (see Song et al., Introduction 1st column 1st paragraph lines 10-12). Therefore, a person of ordinary skill in the art at the time the invention was made would have recognized that charge density and intrinsic viscosity of the charged polymers (cationic and anionic) were result effective variables and could have been optimized.

Further motivation is in Ovenden et al. who teach improved flocculation efficiency using the synergy between cationic polymers (CM) and anionic polymers (Abstract). Ovenden et al. also teach anionic polymers with various charge densities (p.226 2nd column last paragraph lines 1-2 and Table1. 1st column 3rd and 4th rows).

Therefore, a person of ordinary skill in the art at the time the invention was made, knowing that separation of liquid from solid from fermentation liquor reduces the energy requirement and removal of the product leads to higher conversion in a short time, would have been motivated to combine the prior art teachings and to subject the fermentation liquor in the process as taught by Verser et al. to the solid-liquid separation system of Coffey et al. in order to provide a process of separating suspended solids from the fermentation liquor by subjecting the fermentation liquor to a solid-liquid separation stage with predictable results of separating suspended solids from the fermentation liquor. The motivation as taught by Coffey et al. would be to improve the efficiency of water removal (dewatering), and to lower the cost and energy of the process. The claims would have been obvious because a person of ordinary skill in the art at the time the invention was made would have been capable of applying a known technique of solid-liquid separation to separate suspended solids from a known fermentation liquor with a reasonable expectation of success and the results would have been predictable.

Answer to Arguments

Applicant states that the submitting of any terminal disclaimers be done once the present claims are in condition for allowance.

Applicant's arguments with respect to claims 1-3, 5-21 and 23 filed on 06/24/2006 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In this case, a person of ordinary skill in the art at the time the invention was made, knowing that separating liquid from solid in a fermentation liquor reduces the energy requirement and that the removal of product(s) leads to higher conversion in a short time, would have been motivated to subject the fermentation liquor in the process as taught by Verser et al. to the solid-liquid separation system according to the teachings of Coffey et al. in order to provide a process of separating suspended solids from the fermentation liquor by subjecting the fermentation liquor to a solid-liquid separation stage with predictable results of separating suspended solids from the fermentation liquor, because Coffey et al. teach charged polymers made of anionic and cationic monomers are effective for flocculating (page 1 0009). The motivation as taught by Coffey et al. would be to improve the efficiency of water removal (dewatering), to lower the cost and energy of the process, and as taught by Ovenden et al. would be improved flocculation efficiency using the synergy between cationic polymers (CM) and

anionic polymers. Moreover, a person of ordinary skill in the art at the time the invention was made recognizing that charge density and intrinsic viscosity of the charged polymers (involving cationic and anionic) were result effective variables and could be varied by varying the monomer ratio, would have been motivated to optimize the amount of anionic monomer units to be used in the separation system as taught by Coffey et al., in order to improve the flocculation efficiency.

Conclusion

No claims are allowed.

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kade Ariani
Examiner
Art Unit 1651

/Leon B Lankford/
Primary Examiner, Art Unit 1651